Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

AFRL SUCCESSFULLY TESTS MINIATURE SATELLITE THREAT REPORTING SYSTEM

The Space Vehicles Directorate's Miniature Satellite Threat Reporting System (MSTRS) protects a spacecraft from hostile radio frequency (RF) threats by providing a detailed analysis of the threat including the source of the threat. This capability is critical for future satellites.

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Accomplishment

The directorate launched the MSTRS aboard the Space Shuttle Columbia as a payload on the STS-107 mission. During flight, a directorate led ground team and the space shuttle crew performed an experiment to verify the performance of MSTRS by characterizing ground-based RF emissions. The MSTRS experiment successfully demonstrated functionality of recently developed AFRL technology.

Background

Directorate engineers mounted the MSTRS antenna array on top of a SPACEHAB module on Columbia, which had an unobstructed view of earth when Columbia's crew turned the shuttle cargo bay in that direction. The assemblies consisted of two separate three-antenna interferometer baselines with the receiver electronics mounted inside the SPACEHAB module in a shuttle mid-deck locker.

The experiment involved flying over participating ground-based emitters with known characteristics. By comparing the measured signal parameters with those reported by the ground-based emitters, the MSTRS experiment team determined that MSTRS performed properly.

The team transmitted data to the MSTRS ground control computers at Johnson Space Center, Houston, Texas, during flight. The team consisted of personnel from the directorate, Air Force Space Command, Space & Missile System Center, Northrop Grumman Corporation, Los Alamos National Laboratory, Naval Research Laboratory, Joint Spectrum Center, and Schafer Corporation. The MSTRS experiment team declared the MSTRS mission successful at the completion of operation and will publish a technical report detailing the experiment and its results later in the year.

Space Vehicles
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (03-VS-19)